

2

WHAT IS LOGISTICS?

Logistics: Getting the Right Thing to the Right Place at the Right Time.

2.1 CURRENT DEFINITIONS

Swiss Baron Antoine Henry Jomini, in his 1838 *Summary of the Art of War*, made the first significant use of the term "logistics" by defining it as the practical art of moving armies. Admiral Henry Eccles, in his 1959 book, *Logistics in the National Defense*, states that the word "logistics" is an abstraction like the other abstractions of "strategy, tactics, economics, or politics." Thus, logistics is not susceptible to a single, simple, and permanent definition. It is a broad field of endeavor consisting of many interdisciplinary activities ... that, when applied together, constitute the art and science of logistics. John Mosher adds that logistics is an ancient art and an emerging science.

The International Society of Logistics Engineers (SOLE) states that the word "logistics" comes from the Greek word that deals with mathematical calculations, while its French usage relates to the supplying, quartering, and movement of troops. The United States gave the word a much broader definition, that of total support of a product during its system life cycle. SOLE goes further to define logistics as "the art and science of management, engineering, and technical activities concerned with requirements, design, and supplying and maintaining resources to support objectives, plans and operations."

Carl Henn, in the "SOLE Member's Handbook," further defines logistics as "... the integrated design, management and operation of physical, human, financial and information resources over the lifetime of a product, system, or service. In economic terms, it creates *time and place utility* in contrast to *form utility* ..."

John Mosher observes that logistics is a broad field of endeavor consisting of many interdisciplinary activities; but to be characterized as logistics, these and other related functions/activities must be performed, managed, and organized as integrated systems and subsystems. He observes that the depth of knowledge implied for the professional personnel involved (in logistics) is considerable. He states that it is certainly more than one could reasonably expect to find within a single individual and that the necessary systems viewpoint (with proper attention to details) suggests a team composed of experts.

2.2 STRATEGIC LOGISTICS

Strategic Logistics is perhaps the most unexplored area of logistics — the term doesn't even appear in Brimer & Livermore's *Encyclopedia of Logistics Terms*. Martin Binkin, in *Support Costs in the Defense Budget*, observes that defense support is one of the least understood parts of the defense program; and its precise relationship to national security has not been defined. Carter & Merritt, in Chapter 1 of *Mobilization and the National Defense*, state that no recognizable core of primary literature exists which defines the scope and depth of mobilization concerns. They also describe existing literature as being a disjointed, fragmented, and piecemeal collection. The Defense Secretary's Commission on *Base Realignments and Closures*, reports that an ad hoc commission should not become a routine means for addressing subjects that are a part of the day-to-day business of governing. The Commission recommended that an ongoing base-management process be established — clearly an area of strategic logistics.

The Joint Chiefs of Staff have recognized the importance of strategic logistics and, in their proposed final publication of the *Basic National Defense Doctrine (Joint Pub 0-1)*, they define strategic logistics (in the general sense) as the art and science of harnessing the economic and societal strengths of a nation for national defense. In the specific sense, strategic logistics is the process of planning for, coordinating, and allocating the manpower, materiel, infrastructure, and services required for military needs, war production needs, and civil sector needs. It requires coordination between the executive and legislative branches, state governments, and industry. Force generation and mobilization are inclusive components of strategic logistics. Figure 2-1 portrays the division between strategic logistics and applied logistics.

Several years ago, the Air Force Association observed, in *Lifeline in Danger: An Assessment of the United States Defense Industrial Base*, that the number of firms doing defense work, especially at the supplier and subcontractor levels, has been declining for decades and has had a most harmful effect on the nation's defense posture. Thus, domestic industry has difficulty in meeting peacetime, let alone wartime, defense needs.

Von Clausewitz, in *On War*, states the importance of knowing the enemies' means and potential of waging war (the prevailing conditions of the state) — their cash reserves, treasury and credit, as well as the size of their fighting forces. In Sun Tsu's Sixth Century BC book, republished as *The Art of War*, he observed that national unity was an essential requirement of victorious war; but he cautioned against conducting a protracted war, since the resources of the state would not suffice when the army engaged in protracted campaigns. He observed that those who were adept in waging war do not require a second levy of conscripts; nor did they require more than one provisioning.

Writers have postulated that strategic logistics, in the commercial sense, will achieve greater future importance than strategic logistics, in the military sense. Richard Rosecrance, in *The Rise of the Trading State*, contends that nations are becoming so

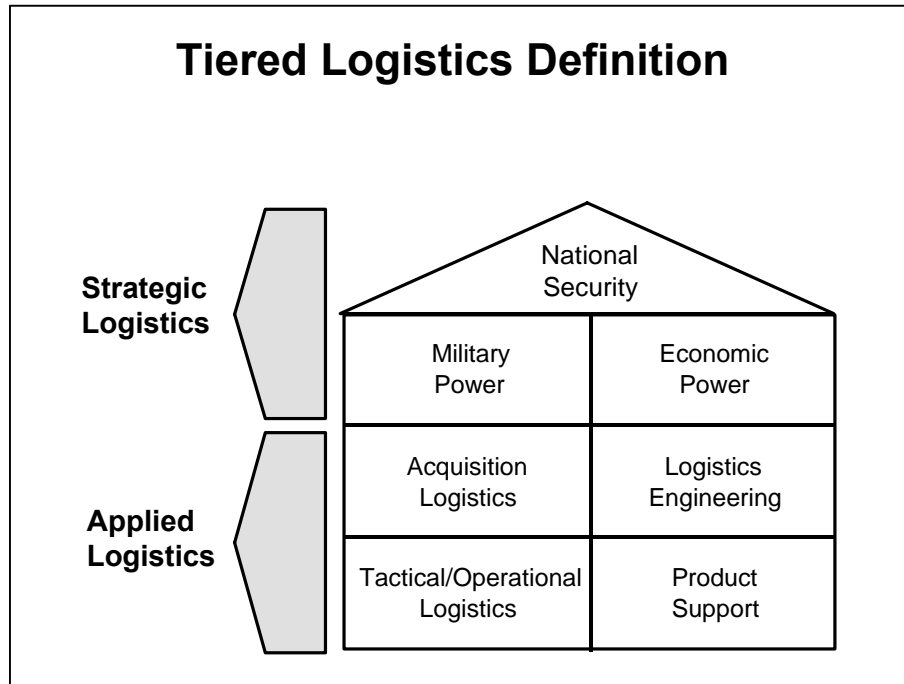


Figure 2-1: Tiered Logistics Definition

economically interdependent as to lessen their tendency to fight one another. Trade, not military might, is now the path to world power. If the real battlefield of tomorrow is the global economy, then strategic logistics — the industrial base and resources of a country (both military & civilian productive capacity) — is of primary importance to our national security and greater attention is warranted.

Alvin and Heidi Toffler, in *War and Anti-War*, take an opposite view and contend that geo-economic conflict will never be a substitute for war; it is often a prelude or provocation to actual war. Wars have resulted from irrationality, miscalculation, xenophobia, fanaticism, and religious extremism when every "rational" economic indicator suggested that peace was preferable.

2.3 APPLIED LOGISTICS

Jim Jones, in the first edition of his *Integrated Logistics Support Handbook*, captures the essence of applied logistics by dividing it into two phases. Phase 1 (commonly referred to as acquisition logistics or logistics engineering) includes everything that is done to plan and acquire support before a system is delivered to the user. Phase 2 (commonly referred to as tactical/operational logistics or product support) includes the things that are done to support the system while it is being used. He notes that actions that occur during Phase 1 dictate how well the system will be supported during Phase 2.

2.3.1 Acquisition Logistics & Logistics Engineering

Acquisition logistics or logistics engineering primarily occurs before the system enters the use phase and is placed in the hands of the customer. (Modifications and product improvements extend the time frame of acquisition logistics.) Tactical/operational logistics commences when the customer starts to use the system.

For contemporary systems, acquisition logistics, or logistics, engineering never really goes away — especially for a modern system. In “America's High Noon Complex,” published in the Sep–Oct '94 *Army RD&A Bulletin*, Norman Augustine described the situation the best. He observed that our military hardware is now on a replacement cycle of about 54 years and that world technology typically has a half-life of from 2 to 10 years. Thus, system/subsystem modifications, changes, improvements, and the like constitute the norm for military systems that may see service lives in excess of 50 years.

Although some commercial systems (such as the DC-3 aircraft, with a service life in excess of 50 years, or the San Salvador Island lighthouse, with a service life in excess of 100 years) may see extended service lives, this is usually not widespread. Commercial customers are more prone to replace/upgrade their systems, and commercial manufacturers are more prone to facilitate system replacements or upgrades. The “new and improved” product, the “newest and latest” model, and the “all new” model are typical commercial terms that belie this phenomenon. Longevity, however, still remains the bellwether of a good design.

The acquisition logistics/logistics engineering function serves as the advocate for the most supportable design from among the feasible design alternatives. These functions are summarized as follows:

IDENTIFYING the Operational Requirements Document (ORD) logistics constraints and defining the resultant logistics support requirements (relative to **each** support element) for each proposed design alternative (while the alternative exists only on paper) is a most difficult job. It requires analytical/engineering skills and the ability to communicate in the language of the design engineer.

ADVOCATING the selection of the most easily supported design alternative involves communicating the logistics support implications of each design alternative to the other members of the Integrated Product Team (IPT).

INFLUENCING the emergence of this design creates cost-effective/supportable detailed design decisions.

REFINING the logistics support requirements (relative to **each** element) to reflect the particulars of the emerging design involves ensuring that the logistics support requirements are defined to the same depth and at the same pace as the emerging design.

TESTING & EVALUATING, based on this real-time definition, is a function that involves planning logistics support for the product/system during developmental/engineering tests and during all early field/operational tests. Successful tests will validate the workability of the planned support.

ACQUIRING all necessary items of support involves ensuring that the system definition and procurement includes both the system/product/service and all requisite items of support for each element. Producing the system and its requisite support items (in quantity) is a necessary follow-up. The real common interest of the manufacturing and logistics communities is producing a quality product that conforms to the design through the reduction of variability in the manufactured design. The reduction of variability leads to products that perform better during the use phase and require less maintenance because they break down less. Thus, the manufacturing and logistics communities have a strong, common area of interest.

PROVIDING the system to the customers in the right place, at the right time, and in the right quantities is done through the execution of a good support plan and/or a first-rate fielding plan.

IMPROVING the system through the inevitable change/modification process is another important function.

These functions represent the core activities of an acquisition logistics member of an Integrated Product Team (IPT), and they are reiterated in Figure 2-2. Note that the execution of a modification program after the system has been produced requires each acquisition logistics/logistics engineering function to be repeated. Thus, acquisition logistics/logistics engineering (in a world of rapidly changing technology) never really goes away.

2.3.2 Tactical/Operational Logistics & Product Support

Tactical/Operational Logistics is perhaps the oldest area of logistics. Van Creveld, in *Supplying War*, defines logistics as "the practical art of moving armies and keeping them supplied." He further observes that logistics, an admittedly unexciting aspect of war, makes up as much as nine-tenths of the business of war.

Kenneth Brown in his National Security Essay, *Strategies: the Logistics-Strategy Link*, addresses the "classic" definition of this area of logistics as commonly associated with the tail of the metaphorical beast that represents the forces with which we wage war. Furthermore, the tooth-to-tail comparison usually contends that more teeth and less tail always makes for a better "fighting animal."

ACQUISITION LOGISTICS FUNCTIONS

Identify	the support.
Advocate	the best design alternative.
Influence	detailed design.
Refine	at the same pace and depth as the rest of the IPT.
Foster	T&E of both system and support system.
Acquire	the support.
Provide	the support to the user.
Improve	the support.

Figure 2-2: Acquisition Logistics Functions

The Joint Chiefs of Staff, in their proposed final publication of the *Basic National Defense Doctrine (Joint Pub 0-1)*, take a classically military viewpoint and define logistics as the science of planning and carrying out the movement and maintenance of forces.

Ben Blanchard, in *Logistics Engineering and Management*, addresses product support in the commercial sector to include such activities as material flow, product distribution, transportation, warehousing, and the like. His more general definition, in *Systems Engineering and Analysis*, is well-suited to defining product support as the composite of all considerations needed to assure the effective and economic support of a system throughout its programmed life cycle.

Most modern manufacturers of durable goods realize the importance of a responsive product support organization and the cost of a dissatisfied customer. The goal of providing excellent performance or at least satisfactory use in service remains. Interest in this area is currently intense.

2.4 IMPLICATIONS

Acquisition Logistics, at its best, requires a "problem prevention" mentality. Operational logistics, on the other hand, generally needs a "problem solving" mentality. Strategic logistics generally requires a "strategic thinking" mentality — someone who sees the "broadest picture."

In the introduction to the 1917 publication, *Pure Logistics*, Stanley Falk stated that the word “logistics” has been in use in the United States for more than a century. For most of this period, people have had difficulty in agreeing on its precise definition. Even to-day, the meaning of logistics is somewhat inexact. In the same book, Lt Col George Thorpe argued that a proper definition {of logistics} was essential for understanding the true role and function of logistics, for ensuring that none of its aspects were neglected, and for achieving ultimate victory in any conflict.

Heskett, Glaskowsky and Ivie, in *Business Logistics: Physical Distribution and Materials Management*, observe that the use of clearly defined terms can provide time savings; but it has taken marketing and production scholars and executives six decades to organize their terminology in a usable, time-saving, and almost universally understandable form. Jomini introduced the term "logistics" in 1838. The time has come to seek a universal definition of logistics.